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ABSTRACT

This study aims first to examine the current status of corporate planning methods, and second, to explore the application of these methods and tools to universities. Several conceptual planning models relating corporate planning to university management are discussed. The report is addressed to administrators of small or medium-sized colleges and universities with limited financial resources. Suggestions are made for developing the preconditions necessary for efficient planning as well as for adopting appropriate corporate planning strategies. Figures illustrate the text. (JS)

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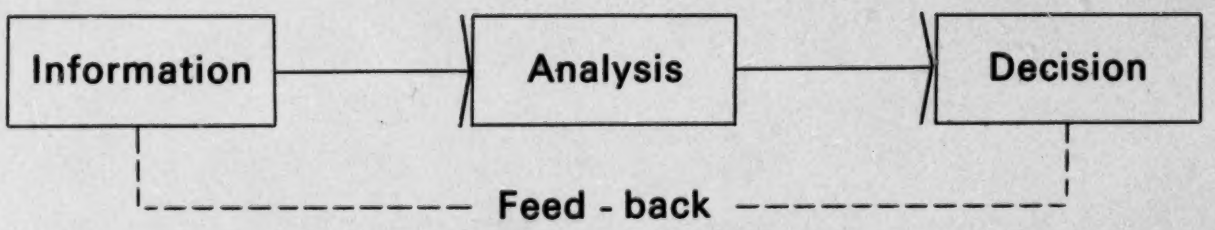
Corporate Planning Models For University Management

Report 4

by

Juan A. Casasco



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ERIC Clearinghouse on Higher Education
The George Washington University, One Dupont Circle, Suite 630
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FOREWORD

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In this paper by Juan A. Casasco, Associate Professor of Planning at The Catholic University of America, Washington, D.C., the application of corporate planning methods to the administration of small or medium sized colleges and universities is discussed. It is the author's belief that adoption of at least some of these planning approaches would greatly enhance the efficiency and quality of college management. Dr. Casasco gratefully acknowledges the comments and suggestions of Guy Black of the Program of Policy Studies in Science and Technology, The George Washington University, and Paul Larkin of the Center for Priority Analysis, The National Planning Association, Washington, D.C.

Carl J. Lange, *Director*
ERIC Clearinghouse on Higher Education
October 1970

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I. INTRODUCTION

Managing today's colleges and universities is becoming increasingly complex, and it often requires the combined efforts of a team of administrators, research analysts, planners, and academicians. In a few institutions, pioneering administrators, in search of new criteria for allocating increasingly scarce resources and better predictive methods have begun to explore and adopt management techniques utilized by defense and business corporations. Although universities and business corporations have obvious philosophical differences regarding their specific aims, objectives, and scope, they share common operative problems. Their similarities lead us to explore problem-solving approaches and methods which have proven successful in corporate planning for their usefulness in dealing with university management problems.

This study aims first to examine the current status of corporate planning methods, and second, to explore the application of these methods and tools to universities. Several conceptual planning models relating corporate planning to university management will be discussed. The study is addressed to administrators of small or medium-sized colleges and universities. It will be assumed that large institutional systems have a sufficient funding base to permit the use of sophisticated management tools, consulting services, and resources, even though there are many schools that do not avail themselves of these tools and techniques.

Many small less endowed institutions operate under severe manpower constraints and have tight funding limits for institutional research. A substantial investment in additional support staff, software, and hardware would be required for most of these institutions to adopt efficient management models. While the level of funding required for these models may not be readily available, colleges and universities could benefit, first, by starting to build some of the conditions for efficient planning, and second, by adopting some of the corporate planning strategies suited to the needs and resources of their institutions–an effective but inexpensive way to improve institutional operations. This study will identify the areas of transfer that show a better rate of return when applied to small institutions with limited resources. It is hoped especially that corporate planning models will provide college administrators with new and more effective methods for allocating scarce resources.

Piecemeal approaches

University management efforts in planning have been generally concerned with budgetary processes, academic programs, and facility usage. Although this trend continues in most colleges and universities, there is a growing awareness of the need for more comprehensive planning. Present efforts are limited to the application of certain data processing and mathematical modeling techniques. These techniques facilitate manipulation of data and permit the university to make long-range forecasts concerning its current decisions. Informal evaluation of ongoing institutional research efforts suggests a preoccupation with sophisticated analytical tools, which, in most instances, are under-utilized, and a misunderstanding of the possibilities and limitations of such tools (see Casasco, 1970). The tools seem to have become the ends of planning rather than the means to achieve broad institutional objectives. At best, they serve now only to answer such operational questions as enrollment projections, space requirements, and budgeting. Unless these issues are viewed within a comprehensive planning framework, university administrators will face serious difficulties in making decisions aimed at satisfying overall institutional objectives. And, at a time when operating costs are mounting and resources are scarce, academic administrators can hardly afford to continue their piecemeal approach to planning.

Before discussing the feasibility and advantages of transferring corporate planning models to universities, a clarification of similarities between the corporation and the university may be helpful. University administrations usually feature a well established decision-making procedure which they are reluctant to change. Tradition-minded academic administrators may, in fact, object to the assumption that their institutions can be compared with a corporation, even within the limits of practical planning. Non-profit institutions are presumed to have different goals from a business corporation, and further, the notion of a university as an economic institution has received little attention. However, the university, like a business corporation, sells and buys services (in the form of teaching, research, and public service, for the university); and its organizational structure is, generally speaking, similar to a decentralized profit-oriented corporation. Allowing for obvious differences, the university can be viewed as a business corporation with participatory management; with the role of faculty as part of the line organization.

While these similarities do not per se assure that business experience will inevitably lead to successful university operations, many business approaches and techniques are feasible for universities, provided that the top university management and planning staff understand and

accept planning as an essential function in the development of their institution.

Administrative understanding and support are important preconditions for successful application of corporate tools and approaches to the university. In the course of previous research (Casasco, 1970), the technical gap was noted between the research analysts constructing and applying mathematical models in several universities, and their administrators. An explanation would seem to be that administrators often lack the background to understand the analytical models their staffs develop for them, and also that the analysts may have become enamored of theoretical constructs and failed to make them operational or applicable or failed to communicate their applicability to the administrators. As Steiner (1969) has observed, in the case of corporate planning,

> **... the world of the manager and the scientist will never be one of complete harmony, but it should be more harmonious than it now is. This can only happen however if both strive harder to bridge the gap.**

Planning can be expensive and complex; it requires substantial time and concentrated effort and, to operate successfully, must overcome institutional inertia and societal resistance to change. Its advantage is, that it does promote more rational policies, even if it doesn't solve all the university's problems. Also, by involving administrators, planning staff, faculty, and students in the decision-making process, planning can build a participatory process that is extremely useful as a communication network and as a means of facilitating a dynamic response to changing events.

II. CORPORATE PLANNING

Corporate planning leads to the formulation of valuable conceptual frameworks and tools for corporate management. Executives are increasingly concerned with long-range planning and the acquisition of scientific tools and staff necessary to tackle analytical problems of increasing complexity and breadth. Each corporation has its own procedures for planning. In an effort to offer a general overview, and in light of the objective of this study, a normative model was selected.

Setting the stage

What appears to be indispensible for success is the existence, or establishment, of certain preconditions. Planning is a coordinated team operation demanding the involvement of top management and supporting staff, as well as a substantial lead time for implementation. One indispensible aspect of planning is the ability to visualize the future of the corporation five to ten years hence. Another is the ability of management to utilize the evaluation and feedback components of the planning process as a corrective mechanism to adjust constantly the course of the corporation toward successful attainment of its development goals. It is also necessary that the chief executive be convinced of the need and utility of long-range corporate planning, otherwise the process may fail and much time will elapse before the frustrations of the experience are overcome. If the chief executive is not "preconditioned" in favor of planning, it would be better to avoid a formal planning effort until he is convinced of the benefits to be accrued from such a costly and time-consuming effort. Seminars or workshops can be held to explain the approaches and methods of corporate planning.

After the preconditioning process is completed, the planning process can be initiated. This process consists of the definition of goals and formulation of effective means to attain them, and stems from historical applications of the scientific method (see diagram on cover). Its key steps are described in Figure 1.

Several tasks of varying importance are required to initiate the corporate planning process. Two of the most important are: development of a conceptual process model, and establishment of the organization for planning. Both these tasks are interrelated and should provide answers to such questions as: What objectives does one wish to achieve? How are these objectives to be reached? What organizational framework is required to reach the desired objectives? Several cycles of trial and error may be necessary to develop optimal organizational models and procedures. As the cycles proceed, some issues will be clarified, and teamwork and coordination will be established.

Terminology

To forestall semantic difficulties, several concepts have been selected for definition. ***Planning*** is a set of procedures by which an organization defines its goals and devises means to attain them.

> **... if foresight is not the whole of management ... it is an essential part of it. To foresee ... means both to assess the future and make provisions for it .... The plan of action is, at one and the same time, the result envisaged, the line of action to be followed, the stages to go through, and methods to use (Fayol, 1949).**

Comprehensive planning, or long-range planning, is equated in this report with corporate planning.

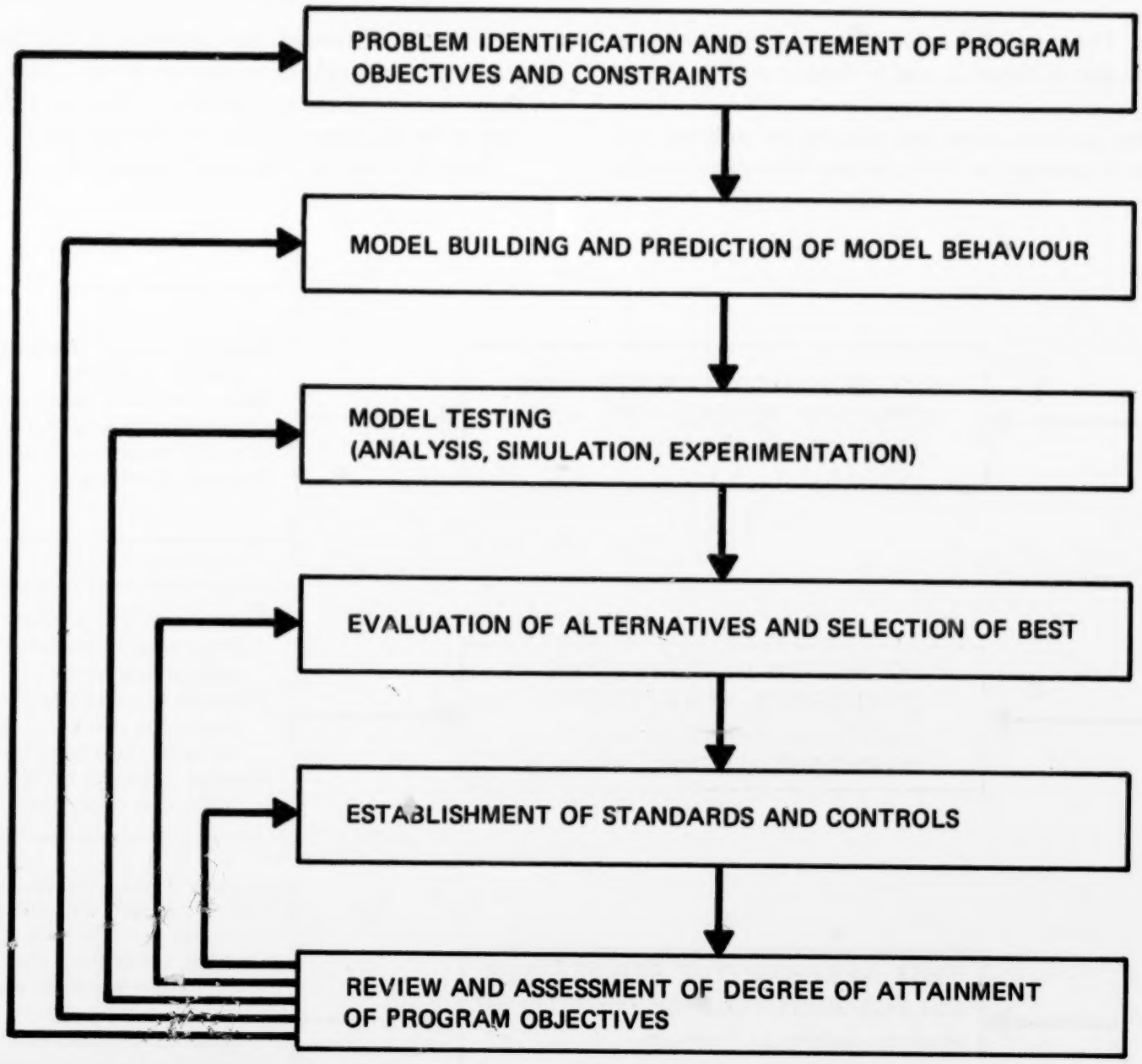
PROBLEM IDENTIFICATION AND STATEMENT OF PROGRAM OBJECTIVES AND CONSTRAINTS
MODEL BUILDING AND PREDICTION OF MODEL BEHAVIOUR
MODEL TESTING (ANALYSIS, SIMULATION, EXPERIMENTATION)
EVALUATION OF ALTERNATIVES AND SELECTION OF BEST
ESTABLISHMENT OF STANDARDS AND CONTROLS
REVIEW AND ASSESSMENT OF DEGREE OF ATTAINMENT OF PROGRAM OBJECTIVES

Fig. 1. The process of goal formulation and attainment.

> Comprehensive planning is the continued formulation of objectives for an organizational entity and the guidance of its affairs toward their attainment .... comprehensive planning means over-all planning for an organizational entity, and functional planning relates to one of its parts (Branch, 1962).

The object of corporate planning is to visualize the future of the firm in space and time. The longer the range of the planning projections, the more flexibility is needed to accommodate unforeseen events.

Goals are broad qualitative philosophical statements connoting ends, aims or purposes. Too often, values and goals are mistakenly used interchangeably. Used here, values represent qualitative moral statements concerning preference of goals, or the worth of a thing. The selection of *organizational goals* has aptly been referred to as strategic planning; Ewing (1968) further clarifies the matter.

> ... goals selected must be feasible for the organization and calculated to inspire enthusiasm, else the executive is likely to fail no matter how much hard work goes into it.

Objectives are aims or targets attainable in a specific period of time and capable of measurement. To evaluate the degree to which a plan has been achieved, it is necessary to develop criteria based upon a hierarchy of objectives and a corresponding set of specifications.

Method of approach

A deductive approach to the process of planning was determined most appropriate for university management after a critical review of selected existing literature. As noted earlier, the concept of planning–corporate and university–stems from the scientific method, and borrows techniques from many areas of knowledge: economics, operations research, and management sciences, to name

only a few. The sequential order of the planning process is shown generally in Figure 1, and in further detail in Figure 2.

First, the user formulates and analyzes the problem and establishes its parameters. The necessary information has to be obtained, compiled, and analyzed to establish problem parameters and provide inputs for model building. Then if there is more than one problem, a hierarchy and criteria have to be developed in order to establish priorities.

Second, a set of alternative courses of action must be

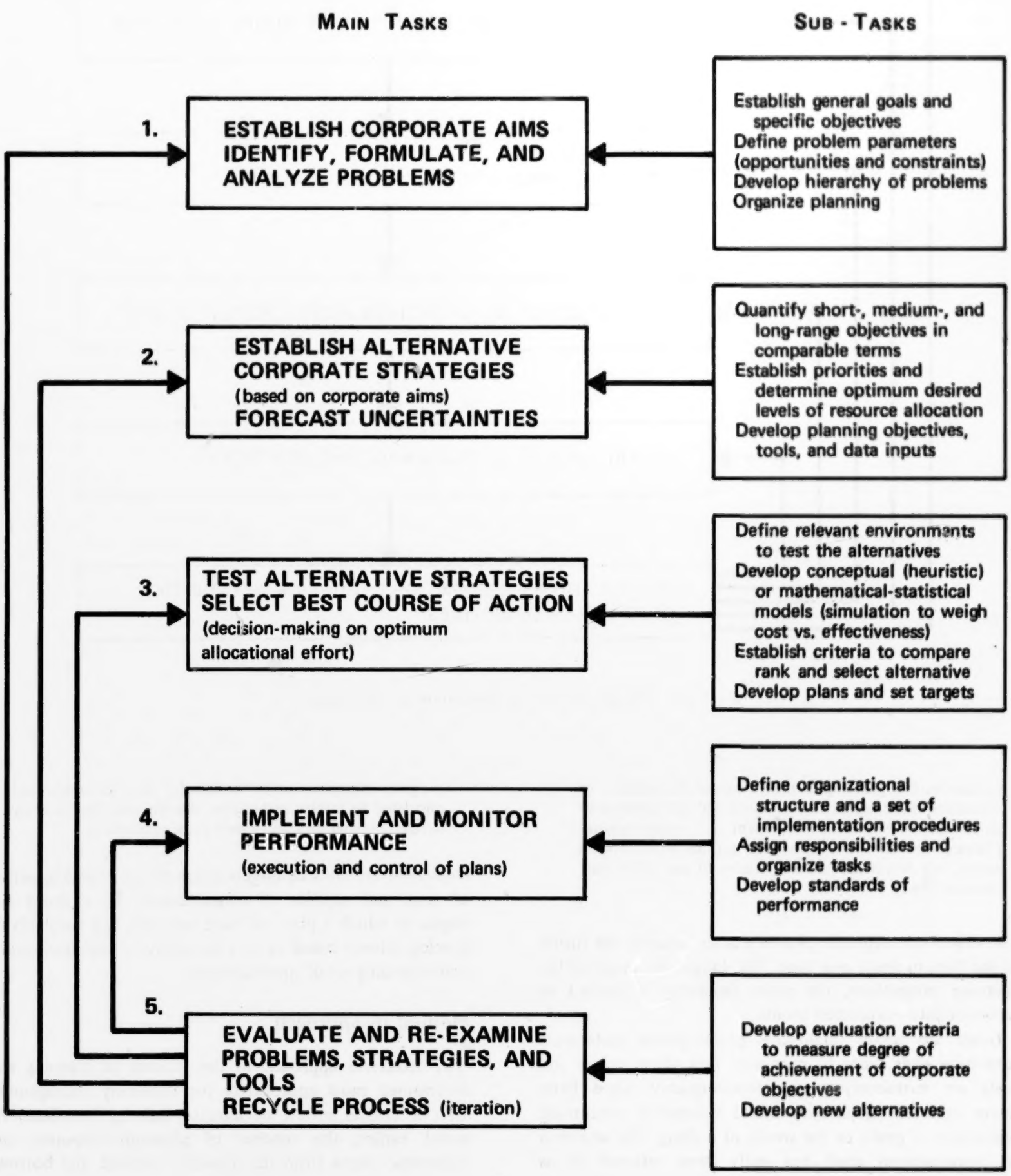
MAIN TASKS
SUB - TASKS
1.
ESTABLISH CORPORATE AIMS
IDENTIFY, FORMULATE, AND
ANALYZE PROBLEMS
Establish general goals and specific objectives
Define problem parameters (opportunities and constraints)
Develop hierarchy of problems
Organize planning
2.
ESTABLISH ALTERNATIVE
CORPORATE STRATEGIES
(based on corporate aims)
FORECAST UNCERTAINTIES
Quantify short-, medium-, and long-range objectives in comparable terms
Establish priorities and determine optimum desired levels of resource allocation
Develop planning objectives, tools, and data inputs
3.
TEST ALTERNATIVE STRATEGIES
SELECT BEST COURSE OF ACTION
(decision-making on optimum allocational effort)
Define relevant environments to test the alternatives
Develop conceptual (heuristic) or mathematical-statistical models (simulation to weigh cost vs. effectiveness)
Establish criteria to compare rank and select alternative
Develop plans and set targets
4.
IMPLEMENT AND MONITOR
PERFORMANCE
(execution and control of plans)
Define organizational structure and a set of implementation procedures
Assign responsibilities and organize tasks
Develop standards of performance
5.
EVALUATE AND RE-EXAMINE
PROBLEMS, STRATEGIES, AND
TOOLS
RECYCLE PROCESS (iteration)
Develop evaluation criteria to measure degree of achievement of corporate objectives
Develop new alternatives

Fig. 2. Conceptual process model of corporate planning.

developed, based upon the fundamental goals of the organization. These strategies include quantifiable and attainable short-, medium-, and long-range planning objectives which are obtained by matching the organization's capabilities with environmental (e.g., market) requirements. Strategic planning includes the forecasting of uncertainties, the determination of policies, the organization of activities and events, and the choice of tools necessary to achieve objectives.

Third, a conceptual or mathematical-statistical model must be developed to test the possible consequences of each alternative. Therefore, in many instances the alternative must be expressed in terms that can be compared. Criteria to compare and select the optimal alternative must be established. At this point, line managers are furnished with an analysis of alternatives and probable consequences; with this information, they can apply value judgments and make decisions.

Fourth, organizational structure and a set of procedures must be defined for implementing plans and monitoring their execution.

Fifth, criteria for evaluation and review must be developed to measure the degree to which objectives are achieved and data are fed back to the decision-makers. This feed-back mechanism allows for early detection of constraints and environmental changes which might affect corporate development. It also makes the planning process dynamic and responsive to change which may occur during the cycle.

A conceptual model of corporate plans is depicted in Figure 3. Three categories of plans–strategic, corporate development, and operations–and two jurisdictional levels of management–corporate and operations–are identified within a comprehensive "system of plans." The model provides for a wide array of corporate activity over an extended time period. Strategic and corporate development plans are in the domain of corporate management while operations and research and development plans fall within the jurisdiction of operating management. This distinction helps clarify decision levels in the planning process, and identifies areas of responsibility within management.

Macroplans, such as a corporate development plan, lead to a second generation of more detailed plans, such as the diversification plan; this, in turn, may be developed in further detail in specific (micro) plans, e.g., the acquisition and merger plan. The "nesting" concept of "tree" presentation format provides a tool for corporate planners to communicate concepts to other areas of management.

Figure 4 depicts a mission "crosscut" illustrated by functions of an international minerals and chemical corporation. The concept of missions provides a useful device to group various market areas. The corporate strategy is to orient management functions (e.g., production, sales, marketing) to serve the various markets. A further breakdown of these markets (e.g., agriculture, industrial, consumer) identifies a series of prime missions or product-lines for each market (e.g., plant nutrition, plant health, animal feed and health, foundry supply, and new products).

New possibilities for growth are consequently analyzed with a changed perspective. Each mission is programmed in terms of planning goals, expenditures and time targets. The corporation adopted a planning, programming, and budgeting (PPB) sequence to present their five-year plans to the Board of Directors every year in the month of March, and prepared detailed one-year budgets from the mid-range plan.

A lesson can be gained by applying the mission "crosscut" approach to a university. The process of application provides an opportunity to define the interrelationships between the different schools or departments (functions) and the areas of academic endeavor (missions). The scheme illustrates the need for deans, department heads, and university management to coordinate their planning and action in order to avoid duplication of effort and facilities.

Organizing for planning

A key function of management is to organize for planning. Responsibilities must be assigned to line and staff personnel, an efficient communications network must be developed for participants in the planning process, and channels and levels of decision making must be clarified.

> **People cannot plan adequately unless they are provided with tools, procedures, techniques, and know-how. Planning is as dependent on good organization, specific training, and good administration as any other phase of work (Besse, 1957).**

The chief executive of the corporation may let his vice presidents deal with day-to-day problems. Subordinate managers or a special assistant to the president may have the responsibility of coordinating and implementing plans and reporting to the chief executive. For planning to be successful, however, the chief executive must, in most cases, be fully involved in the process, and the depth of his commitment must be unequivocably impressed upon his management and staff.

> **. . . the formal distribution of planning responsibility is less significant than the degree to which the top executives of the company, and especially the chief executive, see themselves as significant contributors to the planning process (Tilles, 1964).**

Once the commitment of the chief executive and management is clearly established, the process of formal corporate planning can proceed. The possibilities for organization range from a highly centralized to a very decentralized decision-making process, depending upon the nature of the corporate operation.

Some of the factors that can influence planning organization are the nature of the market, behavioral

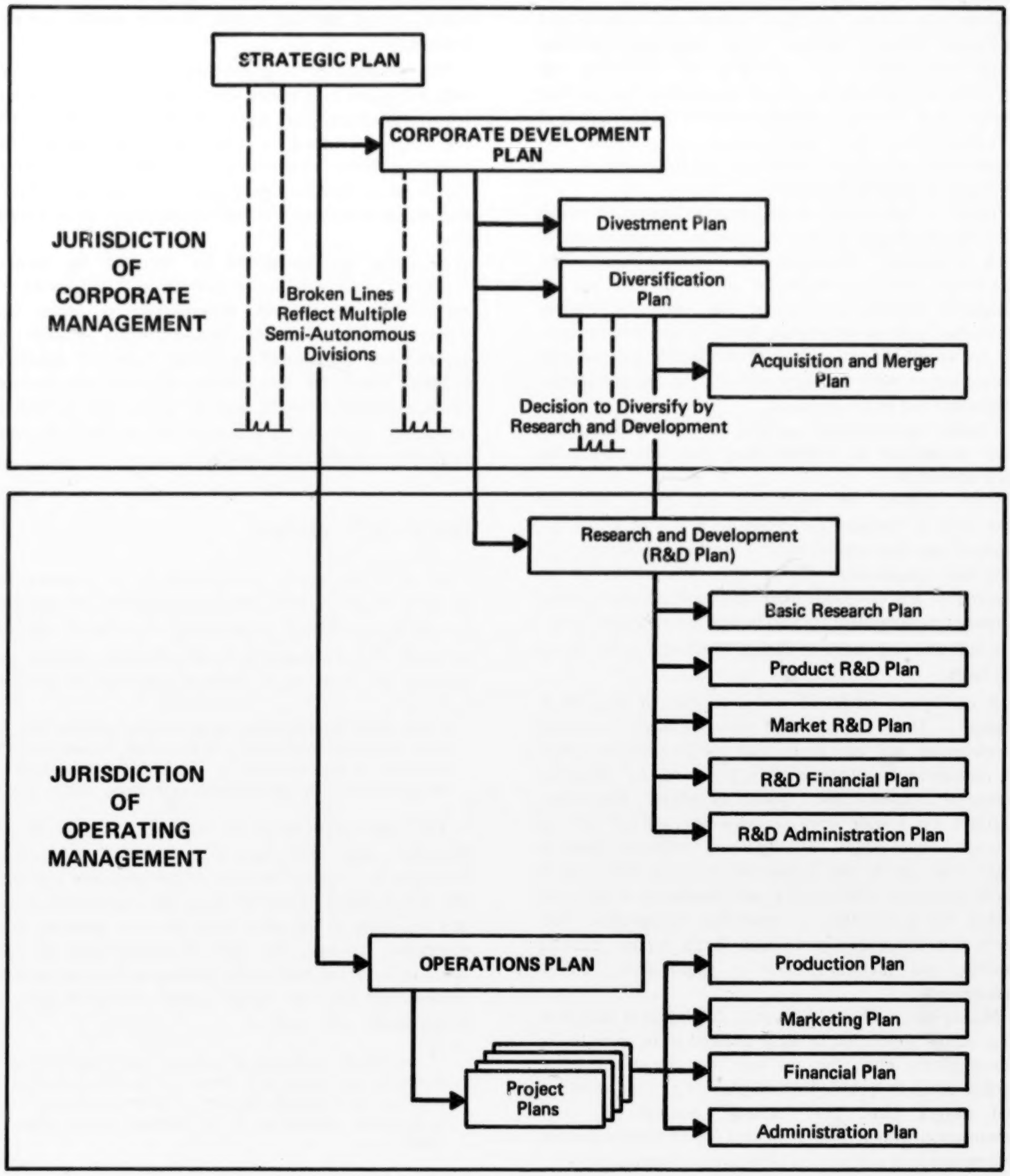

Fig. 3. The system of plans. Data from Steward, 1963.

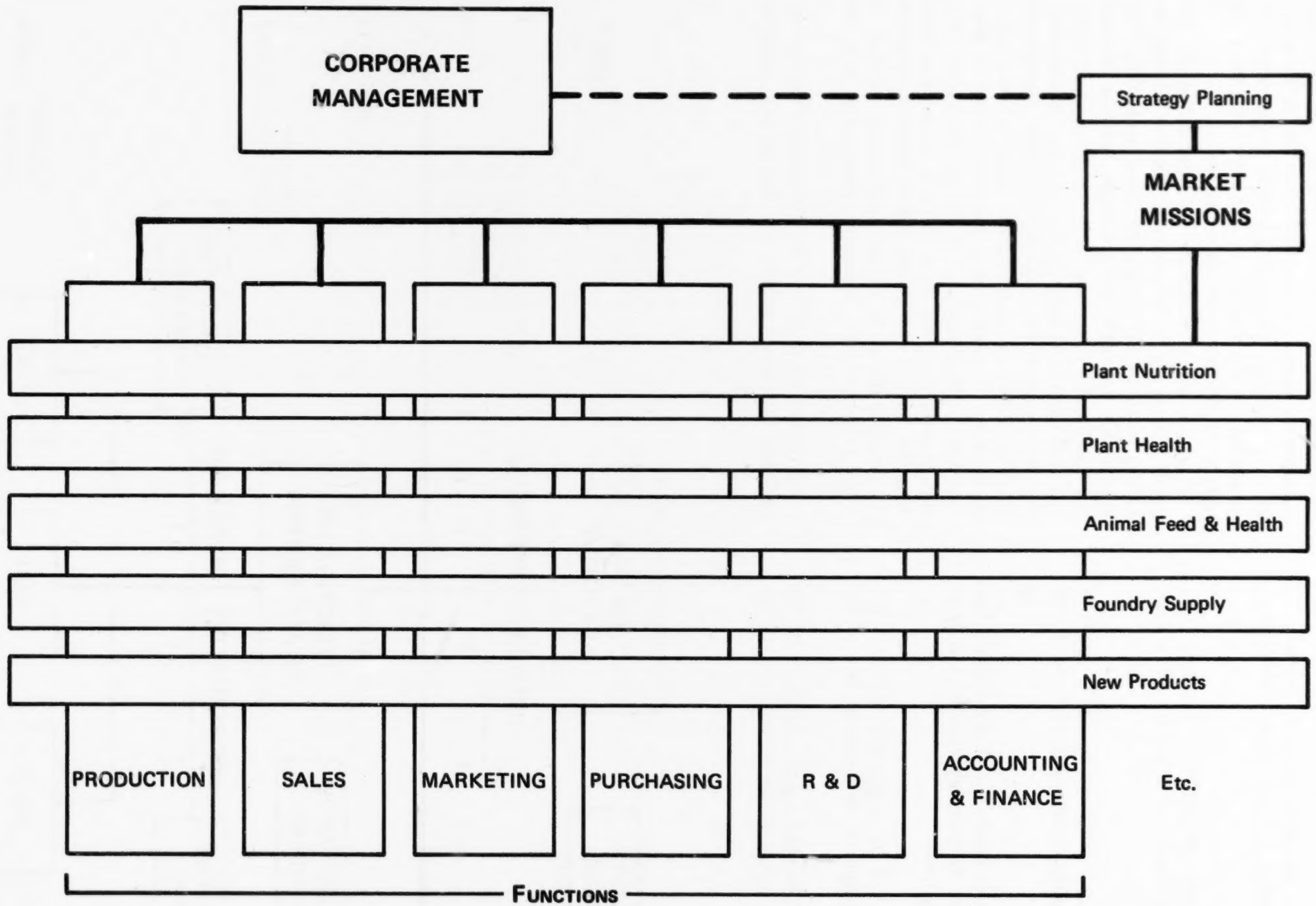

Fig. 4. Mission "Crosscut" on functions of an international minerals and chemicals corporation. Adapted from Smalter, 1964.

characteristics of the staff, and the degree of planning experience of the management. Steiner and Cannon (1966) define five methods of organizing:

1. No effort is made to formalize planning. Typically, in small companies planning is a part of each chief executive's task.

2. Planning is done within an area of the company—e.g., the engineering department of a public utility company.

3. Divisional planning is carried out by field executives while the chief executive centralizes planning at the corporate level.

4. Centralized planning is conducted at the headquarters planning department; no planning executives or staff exist in the operating units.

5. Planning is carried out by a planning executive and staff at both the corporate headquarters and in the operating units.

The range of services provided by the planning staff will also depend upon the nature of the organization. In the case of a centralized corporation, the central planning staff has to provide planning studies which operating units will use to develop their own long-range plans. In a decentralized corporation, the planning staff will help management formulate local objectives and devise strategies for achieving them. Other services might include coordinating the planning process and monitoring the development of planning at the divisional level.

Figure 5 depicts a hypothetical organization for corporate planning in a decentralized situation showing the various locations for integrating component plans. Following this approach, each manager develops his own plans within the framework of overall planning objectives and constraints established by top corporate management. Functions such as the mid-range corporate development plans and long-range comprehensive plans are best undertaken at the corporate management level (Level 1). Planning and implementation of short-term operational plans and projects can best be performed at the functional divisional level (Level 2). Multi-level planning stimulates the personal initiative of divisional managers (Level 3) while preserving the necessary coordination with the corporate divisions.

Universities could adopt this organizational structure for corporate planning simply by substituting academic

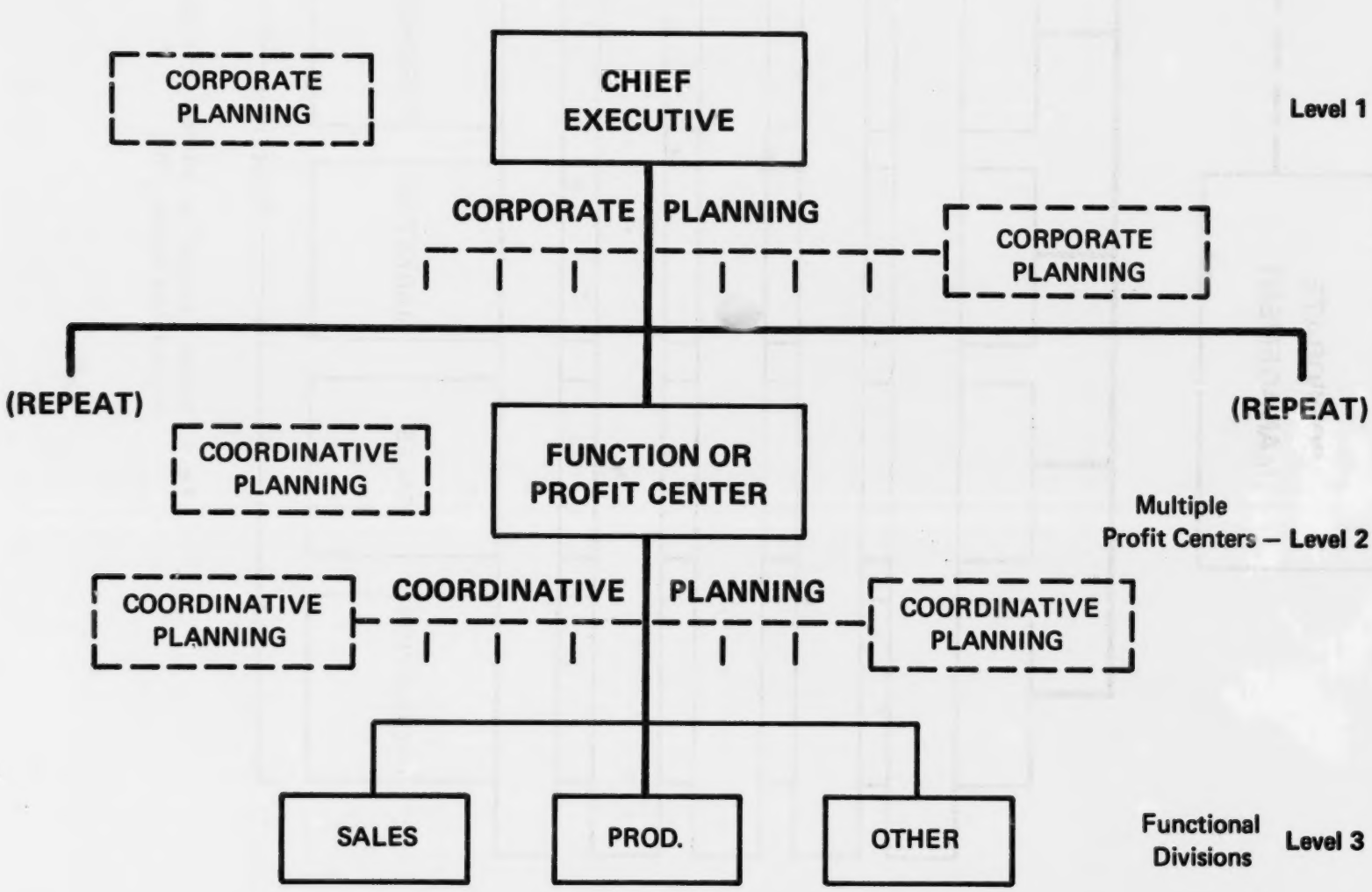

Fig. 5. Organization for corporate planning. *Relationships:* Line _____ ; Staff _ _ _ _ _ _ _ .
Data from Branch, 1962.

terminology. For example, the chief executive (Level 1) would be the university president; function or multiple profit centers (Level 2) would be the schools or colleges; functional divisions would be the departments, and programs of the university. Coordinative planning would take place at both departmental and school levels while university-wide planning would be the responsibility of the administration and the governing body of the institution.

Staffing

To get the planning process started once the particular type of planning organization has been chosen, responsibilities should be assigned to members of the planning team. Initially it may be difficult to establish precise individual responsibilities, but after several cycles, each role will be clear. During the initial cycle, adjustments will be made to match capabilities and personalities with specific tasks. The nature of the organizational structure will, of course, largely determine the choice and size of the planning staff. It may include, for example, only a part-time consultant or extend to a full-fledged corporate planning department including statisticians, market analysts, economists, industrial psychologists, facilities planners, and corporate planning specialists. The board of directors may be involved in a variety of ways. Usually their role is limited to establishing broad policies as guidelines for the planning staff. As the plans are implemented, they receive feedback data which allow them to evaluate the effectiveness of the plans.

Specialized formal training for corporation planners is very recent and perhaps unnecessary since business planning requires an array of backgrounds and experiences. Planning as an academic discipline is still ill-defined. Most commonly, planning staff members have developed special skills through on-the-job experience, and have enhanced these by occasional attendance at special courses and seminars. The majority of planning staffs are trained in the traditional areas of marketing, finance, and engineering.

A key factor for the success of planning is the relationship between line management and planning staff. The planning must proceed, as far as possible, in an atmosphere of understanding and trust. The observations of Branch (1962) on the human factor may cast some light on the complexity of the psychological aspects of planning either within the corporation or other organized groups.

> **There are natural human reactions to be taken into account in developing specific programs of implementation. Many people prefer as little planning as possible. Life at work is simpler and easier if the added analytical effort and schedule of performance implicit in planning is avoided. Energy and enthusiasm for improvement are as much the exception as the rule. Comprehensive planning requires a capacity not only for wrestling with indeterminates but for deciding and acting with incomplete information. People resist uncertainty.... Forecasting is "sticking one's neck out"–an invitation to possible challenge for not making good. Since corporate planning means reducing present returns to advance institutional accomplishments over time, longer-range benefits may accrue to different individuals from those who instigate and carry out the first phases of the plan. The necessary subordination of immediate self-interest does not come easily. Because progressive improvement is its basic objective, planning means change. But people at large do not welcome change as a matter of course. They may believe it will impose further demands upon them, threaten personal security, or necessitate the assimilation of new ideas and ways of doing things. Many persons pay lip service to change, but underneath–perhaps unknowingly–resist it as actively as is safe. Maintaining the status quo is the path of least resistance.... Planning emphasizes balanced reason, all things considered. But emotional man exists just below the surface.... Only when business management has a realistic understanding of human attitudes and reactions can it formulate procedures of implementation which reduce natural resistances and evoke positive responses.**

Tools and techniques

Of the major authors consulted, Branch (1962) and Steiner (1966; 1969) offer the most informative general descriptions of corporate planning tools and techniques. Corporate managers presently have at their disposal a wide array of traditional and new tools and techniques for planning and conducting business operations. Knowledge about planning techniques is also increasing at a fast pace, and new tools are being developed or adopted from other areas of knowledge such as space and defense technology. These include Planning Programming Budgeting Systems (PPBS), a wide range of simulation models, and data processing techniques. Many quantitative and nonquantitative analytical and forecasting tools are available for each of the sub-tasks discussed earlier (Figure 2) as necessary inputs to the main tasks of the corporate planning process.

Figure 6 presents a typology of management tools for planning, analysis, and decision making.

The first main category groups nonquantitative or subjective tools which are based upon value judgment, experience, and intuition. The operational description of these tools lies in the realm of the behavioral sciences, and relies on individual or collective judgment.

The second category outlines some of the more conventional general systems methods and accounting techniques.

The third category includes methods of presenting analytical data in graphic form. The communication value of these visual tools cannot be overemphasized. A well designed flow chart or a Critical Path Method (CPM) network can help management identify bottlenecks, dramatize the importance of making a decision about scheduling, and depict the levels of managerial decisions involved.

The fourth category groups quantitative techniques based upon mathematical and statistical methods. Older techniques may be more appropriate for the management of smaller firms, whose personnel may be more familiar

I. **NONQUANTITATIVE**
(subjective judgment)

- A. Creative mental processes (hunches, creativity, experience, judgment, intuition, brain storming)
- B. Finding the critical factor
  1. Barnard's principle of the limiting factor
  2. Simple decision chains and tables
  3. Asking the right questions
- C. Organization *per se* (planning, organization, and budget system)
- D. Rules-of-thumb
- E. Policies and procedures
- F. Simple problem-solving steps
- G. General knowledge of the field in which a decision is to be made (law, economics, physics, etc.)

II. **GENERAL SYSTEMS METHODS**

- A. Problem design
- B. Nonquantitative simulation model building
  1. Logical-analytical frameworks
  2. Adaptive search
  3. Work flows
- C. Accounting systems and models
  1. Over-all accounting system
  2. Balance sheet and profit and loss statements
  3. Cash-flow analysis
  4. Accounting ratio analysis
  5. Break-even analysis
- D. Design of information systems

  MIS—Management Information Systems

III. **CONVENTIONAL SCHEDULING MODELS**

- A. GANTT (bar) charts
- B. Milestone charts
- C. CPM—Critical Path Method
- D. Line of balance charts

IV. **QUANTITATIVE**
(mathematical-statistical)

- A. Older quantitative methods
  1. Marginal analysis
  2. Return on investment
     a. average rate of return
     b. present value methods
  3. Quantitative forecasting
     a. trend extrapolation
     b. Exponential smoothing
     c. Correlation analysis
     d. Econometric models
- B. Newer mathematical techniques
  1. Probability theory
  2. Computer simulation
  3. Linear programming
  4. Network analysis (Pert/Time and Pert/Cost)
  5. Heuristic problem-solving
  6. Game theory
  7. Cost-benefit analysis
  8. Decision trees
  9. Sensitivity analysis
  10. Utility profiles
  11. Subjective probabilities
  12. Statistical probabilities
- C. Complex methods combining several tools
  1. Systems analysis
  2. Social science research
  3. Sophisticated corporate planning
  4. PPBS—Planning Programming Budgeting System
- D. Control mechanism
  (measures of performance)

Fig. 6. Typology of techniques and tools for management. Adapted from Steiner, 1969.

with conventional methods of analysis. Newer mathematical techniques can be expensive and time-consuming, thus more suitable for complex, larger corporations. However, some corporate staff planners may tend to oversell the potential of sophisticated techniques as planning tools. Simulation models or game theory should be used only when the necessary preconditions for planning exist and then with extreme caution, otherwise they can prove time-consuming, frustrating, and often useless. There are times, therefore, when limited planning—which relies on the older, more easily understood methods and subjective judgment—may be more beneficial.

Systems analysis

Among complex methods that combine many tools, systems analysis and PPBS represent comprehensive and sophisticated corporate planning approaches. Use of these techniques requires close cooperation between line managers and planning staff specialists. Alain C. Enthoven (1965) describes this relationship:

> Systems Analysis can best be described as a continuing dialogue between the policy-maker and the systems analyst, in which the policy-maker asks for alternative solutions to his problems; while the analyst attempts to clarify the conceptual framework in which the decisions must be made, to define alternative possible objectives and criteria, and to explore in as clear terms as possible (and quantitatively), the cost and effectiveness of these courses of action.

Systems analysis is an approach which seeks optimal solutions within the overall perception of executive-level problems in organizations (see Black, 1968). The process of systems analysis in four basic stages is depicted in Figure 7.

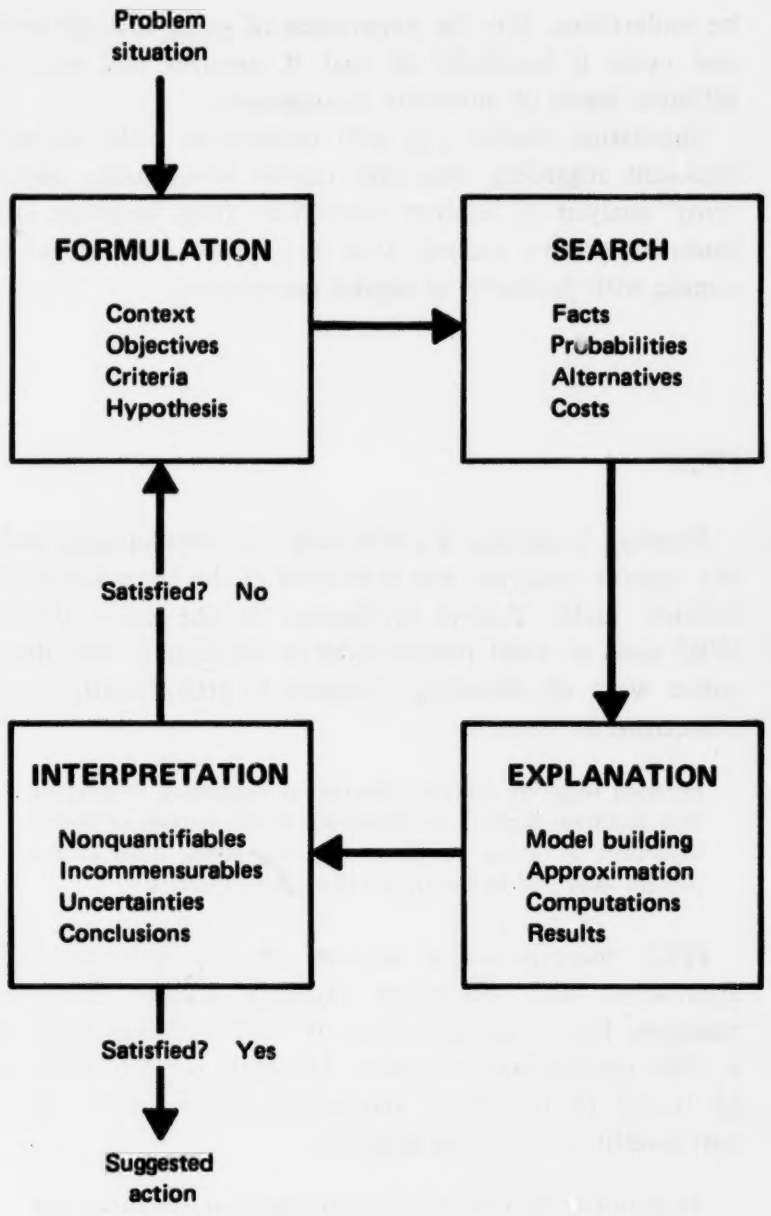

Fig. 7. The process of systems analysis. Data from Quade, 1963. For further reference, see Quade, 1966.

Formulation of the problem requires a breakdown of the process into component elements. If a university is to undertake an analysis of resource allocation, the systems analyst must know what the objectives are. Is the university to reduce operational costs by budget cuts? If so, what areas are to be cut—faculty salaries, administrative overhead, or facilities? Objectives should state whether the maximization of resource allocation should be coordinated with maintenance of academic excellence in areas that are crucial to the attainment of academic objectives, even though operational losses are incurred. The analyst should propose a criterion for the selection of alternative courses of action. Trade-offs should be assessed in broad terms of the costs and benefits of each alternative. In a university environment, systems analysis would provide rigorous quantitative yardsticks to supplement prevailing value judgments, and thereby offer a more rational basis for decision making.

The search stage corresponds to what, in engineering economics, is called a feasibility study or project analysis. At this stage, the cost of each alternative is determined. A university may want to consider the cost of acquiring land in the community surrounding the campus in terms of possible negative economic impact in the community, e.g., displacement of low-income residents. This is an extremely difficult stage since indirect costs and benefits are hard to assess in direct economic terms.

Upon completion of the feasibility study, the facts are explained by means of a model simulating the problem at hand. Simulation models, like an architect's three-dimensional scale model of a campus, allow the university management to assess all the major elements involved in planning for future development. Systems analysis may combine a resource allocation model (budgeting) with a space model (facilities) into a family of models which simulates the entire university system. Several simulation models are discussed in detail in *Planning Techniques for University Management* (Casasco, 1970).

Finally, the simulation model must be tested against an actual situation and further calibrated. If the first results are unsatisfactory, new runs or cycles of the process must

be undertaken. But the experience of going through even one cycle is beneficial in that it involves and informs different levels of university management.

Simulation models can help universities make rational decisions regarding long-term capital investments. Sensitivity analysis is another adaptation from weapons and business systems analysis that could assist universities in coping with problems of capital investment.

PPBS

Program budgeting is a relatively new development and, like systems analysis, was developed at the Department of Defense under Robert McNamara in the early 1960s. PPBS aims to assist management in deciding among alternative ways of allocating resources to attain institutional objectives. In essence,

> program bugeting involves the use of budgetary techniques that facilitate explicit consideration of the pursuit of policy objectives in terms of their economic costs, both at the present time and in the future (Smithies, 1964).[1]

PPBS encompasses a number of previously developed approaches and techniques (systems studies, long-range planning, formal decision analysis) and combines them into a single comprehensive system. The early roots of PPBS can be traced to Keynesian economics and more recently to cost-benefit and systems analysis.

> Budgeting is the process by which objectives, resources, and the interrelations among them are taken into account to achieve a coherent and comprehensive program of action for the government as a whole (Smithies, 1964).

The main innovation of PPBS is that the budget process is oriented toward planning rather than toward management. The major characteristics of PPBS are:

1. Priority setting among goals
2. Analysis of their contribution to the general aims of the organization
3. Development of plans
4. Measurement of goal-achievement and resource requirement
5. Selection of attainable goals
6. Resource allocation
7. Monitoring of progress
8. Evaluation of results

With the adoption of PPBS as a technique for corporate planning, budget decisions are influenced by specific objectives and the cost-benefit analysis of each alternative.

In selecting a conceptual framework for university planning from the several possibilities reviewed, three corporation planning models seem especially suited for utilization by universities:

1. the conceptual "process" model of corporate planning which applies the scientific method
2. the "nesting" of plans model which indicates areas of management responsibility and offers a breakdown of plans and subplans
3. the mission "crosscut" of functions, which provides a visual representation of the interrelations among the different areas of corporate function and the strategic plans of the organization

Each of these three models offers ample and valid possibilities for further experimentation by and application to university management.

III. CORPORATE PLANNING MODELS APPLIED TO UNIVERSITY MANAGEMENT

The component elements of the three corporate models selected as suitable for application by universities can be reformulated in terms of the university environment. Apart from its specific planning application, the process of transferring corporate models to the university sphere is enlightening in several important ways. It obliges the staff involved to take a deeper look at the interrelationships of the component elements, and by this process, to identify meaningful interactions within the system. The transferring process can also help to uncover misconceptions and illustrate to decision makers what planning can and cannot do.

Rather than attempt to apply each of the three models presented, one conceptual process will be examined in detail within the context of university management. The two remaining models could be applied, following the same methodology, by substituting university functions and procedures. This exercise would afford the reader an opportunity to construct a model responsive to his own institution's peculiar possibilities and limitations.

A conceptual process model

> Clarifying the goals and establishing priorities among them are the first order of business in managing the future [of universities] (Eurich in Caffrey, 1969).

[1]For a concise discussion of the application of PPBS to the university, see James Farmer's *Why PPBS for Higher Education*? Boulder, Colorado: Western Interstate Commission for Higher Education, February 1970.

Earlier (Figure 2), the conceptual process model was graphically illustrated for corporate planning; main tasks and their corresponding sub-tasks were discussed in a normative sequence. In transferring this model to an academic planning process, the first main task is to establish (or re-affirm) the aims of the institution. (The institution may want to revise its charter in order to make its aims more responsive to social needs.) The problems that usually provoke the initiation of planning–for example, a severe budget cut by the legislature or a diminishing enrollment in some of the schools of the university–must be clearly identified, formulated, and analyzed by institutional planners at both management and school or departmental levels.

Sub-task One would be to define the large philosophical goals of the university, in order then to develop specific objectives for realization within certain time periods. The latter would be expressed in quantifiable terms to permit evaluation of institutional performance. While major institutional aims might be to transmit and create new knowledge, the specific objectives might refer to the quality of admissions standards, the expected level of performance in graduate and undergraduate programs, management functions or space utilization. The possibilities and limitations which the university faces in trying to attain its aims should be clearly identified at the beginning of the planning process.

The procedure for determining goals and objectives would vary with the institution, but would usually start at the top administrative level where ultimate responsibility for implementation and evaluation rests. In some instances, an ad hoc committee would be nominated to identify university goals and objectives. The committee members would include members of the board of trustees, top university management, administrators, faculty, and students. The process of establishing goals is both iterative and interactive. It is iterative in order to adjust to changing demands from the university and the outside world. As some objectives are achieved and evaluated, others are developed.

Objectives are organized hierarchically, and the criteria for assigning priorities to each depend upon both subjective and objective factors. A rational balance of institutional possibilities and constraints, necessary for assigning priorities and determining desired levels of resource allocation, might be obtained by answering such questions as (Caffrey in Gross and Grambsch, 1968):

How are our goals really determined–and by whom?

What are our actual goals at the present time?

Are we sure we distinguish clearly between our output goals and our support goals?

What if any dissonances exist between our statements about our goals and our actual goals as revealed by what we are in fact doing?

Again, what if any dissonances exist between our real or presumed goals and the goals which leading members or leaders of our institution really prefer?

Foreseeably, as these questions are answered, conflicting views may be presented. It is quite possible, for instance, that the administration's and academic senate's views on budget cuts would conflict. In most cases, ultimate decisions are made by the top management, and if the university has adopted effective planning procedures, the administration is in a strong position to bargain and effect compromises.

During Sub-task One, the planning process is organized on a formal and permanent basis. It is envisioned that for a relatively small institution with an enrollment of 1500 students and a faculty of 50, a feasible planning force would include:

1. the provost or vice president
2. the budget officer, business manager, or equivalent
3. a staff member from the administration to act as Secretary
4. a faculty representative, academic dean or representative of the academic senate
5. a student representative who was elected, or appointed from a slate of candidates presented by the student body.

It is envisioned that service on this university-wide ad hoc committee would require: attendance at monthly meetings, one-fourth of the time of the provost, one-third of the time of the budget officer, the full time of a staff member who would collect and tabulate data, and a few hours of faculty and student time. Possibly, a consultant would be required for special studies on topics such as automatic data processing, management information systems, campus planning, facilities requirements, design, grant applications, and the like. This level of planning effort would be considered the minimum for a growing, dynamic institution. Details on planning organization and procedure are further developed in Figure 8.

Defining strategies

The second main task would be to identify alternative planning strategies based on the university's aims and the anticipated attainment of specified objectives. At this time, planners should decide what tools and techniques to utilize and what data inputs are necessary. A forecast of environmental factors which may affect the university is also necessary–e.g., how will deterioration of the inner city affect the urban campus?

The corresponding Sub-task Two would involve quantification of objectives in comparable terms, e.g., how much funding would be required for personnel, space, maintenance, research, community service, and other operational expenditures.

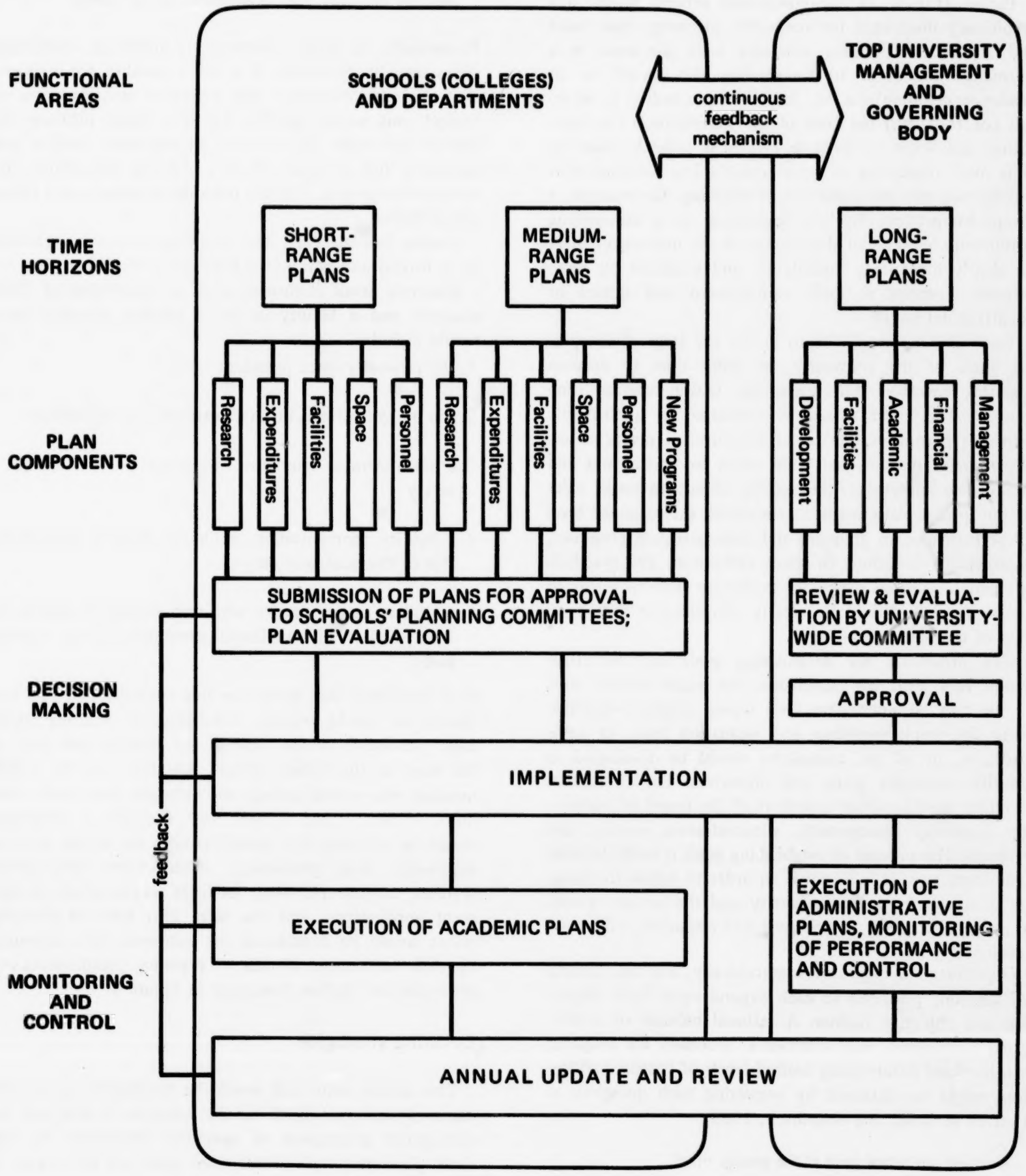

Fig. 8. University organization and procedure for plan formulation, implementation, and review.

From the sets of university objectives and priorities already developed, schools and academic departments would derive basic guidelines for their own planning and resource allocation–e.g., academic plans, budget, staff, facilities, space. These plans would then be coordinated with overall university plans.

The third main task involves the testing of the alternative strategies and selection of one "optimum" plan. Best and optimum are not necessarily equivalent terms in planning. Planning, like politics, thrives on compromise as a means of settling conflicts and matching expectations with possibilities. The planner must be sensitive to the different views held by various university constituencies and be sufficiently astute to weave a plan in which general goals are pursued concomitantly with those of individual groups.

The corresponding Sub-task Three would be to provide quantitative, analytical techniques to test promising alternatives. Several generations of simulation models of various degrees of complexity and effectiveness have been developed during the past few years. This sub-task is crucial since success will depend not only on the propitious "climate" for simulation models and on the quality of available data, but principally on how well the task has been formulated and analyzed.

A variety of available models is discussed in *Planning Techniques for University Management* (Casasco, 1970) in which operational models at various universities across the country are assessed according to their application to specific institutional needs. The models, simulating alternative future environments, offer clues regarding the cost-effectiveness ratio of each alternative tested–e.g., extending library hours versus expanding the library facilities.

Time ranges

Once alternatives are ranked in order of preference, the top academic management must decide which alternative or set of alternatives best suits the university's objectives. Operational plans for each set of institutional objectives will include time targets; and the extent of the plans' detail will vary with the time allowed for achievement. A long-range, seven to ten year general plan (equivalent to the corporate strategic plan) or campus master plan will, for instance, set the stage for a more detailed mid-range five to seven year plan, which in turn will provide the background for a specific short-range plan (equivalent to the corporate tactical plan). Because of the decentralization of academic planning, the coordination of plans with time periods represents a difficult undertaking. Figure 8 illustrates how a functionally centralized planning staff would communicate guidelines and resource allocation levels, and keep interpersonal communication channels continually open among the various schools and departments, research programs, and administrative units.

The fourth main task involves the execution of plans and the monitoring of performance. At this stage, academic and administrative units propose operational plans within the context of the comprehensive long-range plan and the commitments of the university system (see Figure 8). These plans, once accepted and implemented, constitute the basis for measuring performance. An efficient communications network between administrative and academic units must be established so that plans can be implemented and problems promptly detected. The feedback aspect of the communication network permits adjustments, if necessary, to cope with such unforeseen environmental changes or pressures as student protest or urban violence.

Returning to Figure 2, Sub-task 4 consists of four elements which are:

1. Define the organizational structure.
2. Establish a set of implementation procedures.
3. Assign responsibilities and organize tasks.
4. Develop standards of performance.

Because planning functions and decision making in corporate planning are shared progressively and can be decentralized (Rourke and Brooks, 1966), corporate planning processes *are* applicable to universities. In a university–as in a decentralized corporation–the planning committee, with logistical support (statistical data, projection, special studies), prepares long-range plans and transmits them to deans and department heads. Medium-range programs and short-range (tactical) plans are proposed by departments, integrated by the schools, and then transmitted to the university administration for evaluation and approval. Figure 8 outlines procedures for formulating and implementing plans within a university.

To avoid pitfalls, responsibilities and tasks must be clearly defined at the very outset of the planning process. Harmony between administrative and academic units can be established and maintained if scientific management techniques are limited to administrative matters while academic decisions remain "subject to the faculty control that lies at the heart of a university's existence" (Rourke and Brooks, 1966). Both areas of responsibility can be effectively correlated if there is a general agreement on institutional objectives and planning policies.

The fifth and final main task in the process model is to evaluate progress and the effectiveness of the various plans. As illustrated in Figure 8, evaluation proceeds at different levels in the functional units of the university. The development of criteria for plan evaluation is undertaken as Sub-task Five (Figure 2), and it is one of the most crucial factors to the success of the whole process. Here, quantitative measures must be combined with qualitative yardsticks.

Evaluation and feedback mechanisms permit adaptation or development of new plans. This last main task also includes: (1) the reexamination of problems which, since their initial formulation, would have changed, and (2) the development and adoption of new planning tools and

procedures. Completion of this task signifies the end of the first planning cycle for stated objectives and plans and the beginning of a new cycle in the planning process. Possibly, short-term operations plans would be recycled on a yearly basis to coincide with annual budgetary planning. Mid-term plans could be recycled on a longer term basis.

Conclusion

The three corporate models examined here offer university administrators a conceptual framework with which to initiate comprehensive planning. Although these models are not the only way planning can proceed, they appear to accommodate all the patterns and processes observed in the literature as necessary for the practice of formal planning.

The basic prerequisite for comprehensive university planning is the establishment of correct attitudes toward planning. Top university decision makers and their staff should be prepared to:

1. understand the possibilities and limitations of planning and its tools and process as a function of management
2. accept the fundamental principles of comprehensive long-range institutional planning
3. be fully committed to developing and maintaining effective planning operations as a means of making better decisions

If these conditions are met, ad hoc and random decisions will be avoided, and the decision-making process will be substantially improved. If these conditions are not met, it is best not to initiate planning activities until a favorable climate exists.

University planning and the models examined here are tools for university management and, as such, have limitations. Use of the models requires a long lead time, is expensive, and demands extensive involvement on the part of top level administrators. However, when chosen judiciously and applied efficiently, models can help make planning an iterative, dynamic process and can contribute toward making the university an harmoniously operating and innovative organization.

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